REMARKS

This Amendment is in resp nse to an Office Acti n dated September 13, 2001. On November 8, 2001, a telephone conference was conducted between the Examiner, the named inventor Mr. Hai Bui, and the undersigned attorney. The discussion of the meeting focused on the accumulator and distinctions between the fluidic capacitor of Costin. It was mentioned that claims 38 and 39 are still pending and reference of their cancellation in the Preliminary Amendment was a typographical error.

I. Drawing Objection

In the Office Action, the drawings were objected to because the architecture of the accumulator (34) shows the first chamber (40), second chamber (42) and flexible membrane (38) but not in detail. The details of the accumulator are further described on Page 7, line 17 through page 8, line 16 of the Specification. In response, Applicant has added Figure 2 to more clearly illustrate the architecture of the accumulator (34). The additional Figure 2 does not constitute new matter. Applicant respectfully requests withdrawal of the objection.

II. §112 Rejections

Claims 1, 3-8, 13, 16-22, 35, 37-50 were rejected under 35 U.S.C. § 112, second paragraph. Applicant respectfully submits that the accumulator (34) is shown in Figure 1 and thoroughly described on page 7, line 17 through page 8, line 16 of the specification. It is evidence that the "accumulator pressure sensor" terminology has caused confusion that the accumulator merely operates as a pressure sensor. Rather, the accumulator may assist in the fluid pressure sensing by pressure transducer (44) but also maintains pressurized fluid and supplies such fluid in response to an event. Therefore, as set forth above, Applicant has amended the specification to remove the phrase "pressure sensor" from the accumulator term

in order to eliminate such confusion. It is submitted that such amendments do n t add new matter.

In light of the foregoing, Applicant respectfully request withdrawal of the outstanding § 112 rejection.

III. §102(b) and §103 Rejections

Currently, claims 1, 4-6, 8, 10, 13, 16-18, 20, 21, 35, 40-50 are rejected under 35 U.S.C. § 102(b) as being anticipated or alternatively rendered obvious by U.S. Patent No. 5,733,256 (Costin) and claims 3, 7, 19, 22, 23, 34 and 37-39 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Costin in view of U.S. Patent No. 5,609,576 (Voss et al.). Applicant respectfully disagrees with both rejections because Costin does not have any pressurized fluid storage capability and does not supply such fluid as now set forth in independent claims 1, 13, 35, 37, 41, and 48.

In light of the foregoing, Applicants respectfully request the Examiner to withdrawal the §§ 102(b) and 103(a) rejections and place the application in condition for allowance. If further discussion of the distinctions is warranted, the undersigned attorney respectfully requests the Examiner to contact him at his earliest convenience.

VERSION SHOWING MARKED CHANGES TO THE APPLICATION

IN THE SPECIFICATION

Please amend the Specification as follows:

Please insert the following paragraph on page 5 as the last paragraph:

Figure 2 is an exemplary embodiment of the accumulator of Figure 1.

Please replace the paragraph beginning at page 7, line 9 with the following paragraph:

The irrigation system 14 may further have an accumulator [pressure sensor] 34 coupled to the irrigation line 30. The accumulator [pressure sensor] 34 may be coupled to a controller 36. The controller 36 may also be coupled to the pump 28. The controller 36 may include a microprocessor, memory, etc. that can receive input signals, process the signals in accordance with a software routine(s) and provide output signals.

Please replace the paragraph beginning at page 7, line 17 with the following paragraph:

The accumulator [pressure sensor] 34 may include a flexible membrane 38 that separates a first chamber 40 from a second chamber 42. The first chamber 40 is in fluid communication with the irrigation line 30. The second chamber 42 is in fluid communication with a pressure transducer 44 of the controller 36.

Please replace the paragraph beginning at page 8, line 3 with the following paragraph:

The accumulator [pressure sensor] 34 provides multiple functions. The first chamber 40 provides a reservoir of pressurized fluid for the system and functions as a fluidic capacitor that can maintain the intraocular pressure of the eye. The flexible membrane 38 and first chamber 40 can also filter pressure pulsations created by the pump 28. Additionally, the flexible membrane 38 provides a non-invasive means for sensing the pressure within the irrigation line 30. The system may include an accumulator (not shown) that provides additional capacitance for the second chamber 42. The additional accumulator may reduce

the sensitivity of the pressure sensor 34 and allow greater volume of irrigation fluid to be stored in the first chamber 40.

Please replace the paragraph beginning at page 9, line 12 with the following paragraph:

By way of example, if the valve 46 is open and the actual pressure is greater than the desired range, the controller 36 can decrease the speed of the pump 28 to reduce the irrigation pressure. Likewise, if the actual pressure is less than the desired range the controller 36 can increase the speed of the pump 28. If the valve 46 is closed the irrigation pressure can be decreased by reversing the direction of the pump 28 to pump fluid out of the accumulator [pressure sensor] 34. The controller 36, [sensor] accumulator 34 and pump 28 can thus be used as a closed loop feedback system to control the intraocular pressure of an eye during a surgical procedure.

Please replace the paragraph beginning at page 12, line 8 with the following paragraph:

The threshold resistance value(s) can be normalized with the actual resistance of the system by either calculating the system resistance, or measuring the resistance when the system is set up and the device is inserted into a test chamber . The system resistance can be calculated by allowing irrigation fluid to flow through the irrigation line, test chamber and aspiration line, and then determining the resistance by dividing the sensed differential pressure by the measured flowrate. The flowrate can be determined from the speed of the pump 28. The differential pressure can be determined from the pressures sensed by sensor[s] 27 and accumulator 34.

IN THE CLAIMS

1 1. (Thrice Amended) An irrigation system for a medical device, comprising:

an irrigation reservoir;

an irrigation line coupled to said irrigation reservoir;

a pump coupled to said irrigation line;

an accumulator [pressure sensor] including a first chamber in fluid communication with said irrigation line, a second chamber, and a flexible membrane that separates said first chamber from said second chamber and deflects in response to a change in an amount of fluid pressure in the irrigation line, said first chamber of said accumulator providing a reservoir for pressurized fluid and supplying said pressurized fluid to said irrigation line in response to reduced speed of said pump; and,

a controller including a pressure transducer in fluid communication with said second chamber to detect a change of fluid pressure in said second chamber caused by the deflection of the flexible membrane and to adjust a flowrate of fluid passing through said irrigation line to counteract the change in the amount of fluid pressure in the irrigation line by varying a speed of said pump.

2. Cancelled.

3. The irrigation system of claim 1, further comprising a valve coupled to said irrigation line and said controller.

4. (Amended) The irrigation system of claim 1, wherein said controller activates an indicator to provide a warning to replace said irrigation reservoir.

5. (Twice Amended) The irrigation system of claim 1, wherein said controller varies said pump speed in response to a variation in the irrigation line pressure sensed by said pressure transducer that rises above a desired range of pressures.

6. The irrigation system of claim 1, wherein said controller can determine a flowrate generated by said pump.

7. The irrigation system of claim 6, wherein said controller determines an actual fluidic resistance from the flowrate and provides an output signal if the actual fluidic resistance is greater than a threshold value.

8. The irrigation system of claim 6, wherein said controller determines an actual volume of irrigation fluid pumped by said pump from the flowrate and provides an output signal if the actual volume of irrigation fluid is greater than a threshold value.

9. Cancelled.

10. Cancelled.

11. Cancelled.

12. Cancelled.

13. (ThriceAmended) A medical system, comprising:

an irrigation system that includes

an irrigation reservoir,

an irrigation pump that is coupled to said irrigation reservoir,

an irrigation line coupled to said pump,

an accumulator[pressure sensor] including a first chamber in fluid communication with said irrigation line, a second chamber, and a flexible membrane that separates said first chamber from said sec nd chamber and deflects in response to a change in an amount of fluid pressure in the irrigation line, said first chamber of said accumulator providing a reservoir of pressurized fluid and supplying said pressurized fluid to said irrigation line in response to reduced speed of said pump; and,

a controller including a pressure transducer in fluid communication with said second chamber and to control the pressure within said irrigation line through monitoring a change of fluid pressure within said second chamber of said accumulator[pressure sensor]; and

an aspiration system that includes

an aspiration pump,

an aspiration line coupled to said aspiration pump, and

an aspiration pressure sensor that senses a vacuum pressure within said aspiration line.

14. Cancelled.

15. Cancelled.

16. (Amended) The medical system of claim 13, wherein said controller maintains an intraocular pressure by varying a speed of said irrigation pump and a flowrate through said irrigation line.

17. (Thrice Amended) The medical system of claim 16, wherein said controller varies said speed f said irrigation pump in response to a variation in fluid pressure in said first chamber of said accumulator[pressure sensor] as sensed by said pressure transducer.

18. The medical system of claim 13, wherein said controller can determine a flowrate generated by said irrigation pump.

19. The medical system of claim 18, wherein said controller determines an actual fluidic resistance from the flowrate and provides an output signal if the actual fluidic resistance is greater than a threshold value.

20. (Amended) The medical system of claim 18, wherein said controller determines an actual volume of irrigation fluid pumped by said irrigation pump from the flowrate and provides an output signal if the actual volume of irrigation fluid is greater than a threshold value.

21. (Amended) The medical system of claim 19, wherein said controller provides an output signal that is used to control power of a medical device that is coupled to said irrigation line and said aspiration line if the actual fluidic resistance is greater than a device threshold value.

22. (Amended) The medical system of claim 19, wherein said controller changes a speed of said aspiration pump if the actual fluidic resistance is greater than a threshold resistance value.

1 23. Cancelled.

1 24. Cancelled.

1 25. Cancelled.

1 26. Cancelled.

1 27. Cancelled.

1 28. Cancelled.

1 29. Cancelled.

1 30. Cancelled.

1 31. Cancelled.

1 32. Cancelled.

1 33. Cancelled.

1 34. Cancelled.

1 35. (ThriceAmended) The [An] apparatus of claim 37 further [,] comprising:

[an irrigation pump;
an irrigati n line in fluid c mmunicati n with the irrigation pump;
a first pressure sensor in fluid communicati n with the irrigation line;
an aspiration line;]
a second pressure sensor in fluid communication with the aspiration line;
an aspiration pump in fluid communication with the aspiration line; and,
a controller coupled with the first and the second pressure sensors to sense a differential pressure between the irrigation line and the aspiration line and to vary a speed of the irrigation pump in efforts to maintain a flow rate in the irrigation line substantially in proportion to the flow rate in the aspiration line.

36. Cancelled.

37. (Twice Amended) An [The] apparatus[of claim 35, further] comprising:
an irrigation pump;
an irrigation line in fluid communication with the irrigation pump;
a first pressure sensor in fluid communication with the irrigation line;
an aspiration line; and,
a first accumulator located between the irrigation line and the first pressure sensor, the first accumulator including a first chamber in fluid communication with the irrigation line temporarily to provide [said] stored pressurized fluid in response to dislodgment of an occlusion of the aspiration line after the occlusion has already caused a substantially reduced speed of the irrigation pump, a second chamber in fluid communication with the first pressure sensor and a flexible membrane which separates the first and the second chamber.

38. The apparatus of claim 37 wherein the first accumulator is sized to maintain an intraocular pressure of an eye into which the medical device is to be inserted.

39. The apparatus of claim 37, further comprising a second accumulator in fluid communication with the second chamber.

40. The apparatus of claim 35, wherein the controller is further to determine that an occlusion of the aspiration line has occurred if the differential pressure increases.

41. (Amended) An irrigation system for a medical device, comprising:

a pump;

an irrigation line coupled to said pump;

a controller that varies a speed of said pump to adjust a flowrate of fluid passing through said irrigation line; and

an accumulator including (i) a first chamber operating as a reservoir to store pressurized fluid separately from [and] fluid passing through said irrigation line, (ii) a second chamber and (iii) a flexible membrane that separates said first chamber from said second chamber, said accumulator provides said pressurized fluid from said first chamber to said irrigation line to maintain intraocular pressure of an eye.

42. The irrigation system of claim 41 further comprising an irrigation reservoir coupled to said irrigation line.

43. (Amended) The irrigation system of claim 42, wherein said pressurized fluid from said first chamber is provided t said irrigation line to mitigate transit latency of fluid from said irrigation reservoir.

44. The irrigation system of claim 41, wherein said flexible membrane of said accumulator is deflected in response to a change in fluid pressure in said irrigation line and causes a change in fluid pressure in said second chamber.

45. The irrigation system of claim 44, wherein said controller including a pressure transducer in fluid communication with said second chamber to detect the change of fluid pressure in said second chamber caused by deflection of said flexible membrane and to adjust a flowrate of said fluid passing through said irrigation line to counteract the change in fluid pressure in said irrigation line by varying the speed of said pump.

46.. The irrigation system of claim 42, wherein said controller activates an indicator to provide a warning to replace said irrigation reservoir.

47. Cancelled.

48. (Amended) An [The] irrigation system for a medical device [of claim 47,] comprising:

an irrigation line;

a pump coupled to said irrigation line;

an accumulator including a first chamber in fluid communication with said irrigation line, a second chamber, and a flexible membrane that separates said first chamber from said second chamber and deflects in response to a change in an amount of fluid pressure in the irrigation line, [wherein the] said first chamber of said [the] accumulator operating as a reservoir to store fluid separately from fluid passing through said irrigation line, said fluid

provided from said first chamber t said irrigati n line t temporarily maintain intraocular pressure of an eye; and,

a controller including a pressure transducer in fluid communication with said second chamber, said controller to detect a change of fluid pressure in said second chamber caused by the deflection of the flexible membrane and to adjust a flowrate of fluid passing through said irrigation line to counteract a change in the amount of fluid pressure in said irrigation line by varying a speed of said pump.

49. The irrigation system of claim 48 further comprising an irrigation reservoir coupled to said irrigation line.

50. The irrigation system of claim 49, wherein said fluid from said first chamber is provided to said irrigation line to account for a delay of additional fluid being provided from said irrigation reservoir.

CONCLUSION

In view of the foregoing, Applicants contend that the pending claims are in condition for allowance and respectfully request the Examiner to reexamine these claims. Allowance of these claims at Examiner's earliest convenience is respectfully solicited.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: November 29, 2001

WILLIAM W. SCHAAL
Reg. No. 39,018

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being transmitted via facsimile under 37 CFR §1.8 on: November 29, 2001.

Corrinn R. Reynolds *Date* 11/29/01

12400 Wilshire Boulevard, Seventh Floor
Los Angeles, California 90025
(714) 557-3800